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Non Invasive Imaging

CORONARY ARTERY CALCIUM SCORE OF <100 EFFECTIVELY RULES OUT PRESENCE OF SIGNIFICANT ISCHEMIA, WHILE >=400 RULES IN-INSIGHT FROM A META-ANALYSIS OF 14 STUDIES

Poster Contributions
Hall C
Saturday, March 29, 2014, 10:00 a.m.-10:45 a.m.

Session Title: Coronary and Cardiac CT: Improving Diagnoses
Abstract Category: 18. Non Invasive Imaging: CT/Multimodality, Angiography, and Non-CT Angiography
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Background: Single photon emission myocardial perfusion imaging (SPECT-MPI) remains commonly used in the detection of myocardial ischemia. However coronary artery calcium scoring (CAC) is being increasingly used for assessment of stable coronary artery disease.

Methods: A search was made of the PubMed, CENTRAL, EMBASE, CINAHL, EBSCO, and Web of Science databases for studies that compared SPECT-MPI with CAC, and reported detection rates of ischemia with SPECT-MPI. We derived a CAC score of <100 and >=400 as thresholds for detection of ischemia. A random effects model was used to pool sensitivity and specificity of CAC in the detection of ischemia. In addition, detection rates of ischemia with CAC were correlated with SPECT-MPI, and standardized receiver-operating curve (ROC) was drawn to compare CAC with SPECT-MPI.

Results: 14 studies (N=6255) were detected which compared CAC scores and reported ischemia detected with SPECT-MPI. There was a strong correlation with ischemia detected with SPECT-MPI and CAC score >=400 (Spearman correlation coefficient: 0.609; p-value= 0.021). There was good specificity of CAC >=400 in detecting ischemia 74% (73%-75%) (ROC-AUC 0.76), however it did not have good sensitivity 55% (52%-58%). For a threshold of CAC <100, there was good sensitivity in ruling out ischemia 80% (77%-83%) (ROC-AUC 0.77), however detection threshold of CAC >100 did not have good specificity 66% (65%-67%).

Conclusion: Thresholds of CAC of <100 and >=400 may effectively detect significant ischemia.

Figure A: Sensitivities and Specificities for Coronary Artery Calcium>=400 and Ischemia

Study	TP	FP	FN	TN	Sensitivity (95% CI)	Specificity (95% CI)
Anand et al.	45	56	21	98	0.68 [0.56, 0.79]	0.64 [0.56, 0.71]
Anand et al. 2006	34	23	23	85	0.60 [0.46, 0.72]	0.79 [0.70, 0.86]
Blumenthal et al.	18	38	3	201	0.86 [0.64, 0.97]	0.84 [0.79, 0.88]
He et al.	63	74	18	256	0.78 [0.67, 0.86]	0.78 [0.73, 0.82]
Ho et al.	23	292	11	377	0.68 [0.49, 0.83]	0.56 [0.52, 0.60]
Matsuo et al.	27	14	26	38	0.51 [0.37, 0.65]	0.73 [0.59, 0.84]
Piers et al.	16	45	58	412	0.22 [0.13, 0.33]	0.90 [0.87, 0.93]
Ramakrishna et al.	40	180	29	586	0.58 [0.45, 0.70]	0.77 [0.73, 0.79]
Rozanski et al.	46	324	18	765	0.72 [0.59, 0.82]	0.70 [0.67, 0.73]
Schenker et al.	80	85	99	357	0.45 [0.37, 0.52]	0.81 [0.77, 0.84]
Scholte et al.	8	10	15	67	0.35 [0.16, 0.57]	0.87 [0.77, 0.94]
Seyahi et al.	5	14	1	15	0.83 [0.36, 1.00]	0.52 [0.33, 0.71]
Wong et al.	52	256	27	708	0.66 [0.54, 0.76]	0.73 [0.71, 0.76]
Yao et al.	4	3	27	39	0.13 [0.04, 0.30]	0.93 [0.81, 0.99]

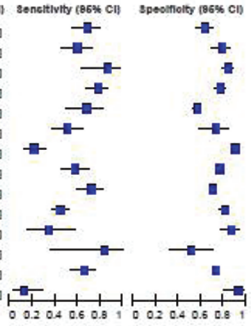

Figure B: Standardized receiver-operating curve comparing CAC with SPECT-MPI.